

The *Eucosma hohenwartiana* group of species (Tortricidae)

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Abstract. The *Eucosma hohenwartiana* group of species is reviewed to take account of constant structural differences in the ovipositor of the females. Two taxa whose status has been in doubt are removed from synonymy with *E. hohenwartiana* ([Denis & Schiffermüller], 1775) and restored to full species rank: *E. fulvana* (Stephens, 1834) sp. rev. and *E. parvulana* (Wilkinson, 1859) sp. rev. [= *scutana* (Constant, 1893) syn. n.]. Their respective host plants are given. Lectotypes of *E. fulvana* and *E. parvulana* are designated.

Zusammenfassung. Die Arten der *Eucosma hohenwartiana* Gruppe werden revidiert und zwei Taxa von unsicherem Status werden auf Grund konstanter Unterschiede in der Struktur des Ovipositors der Weibchen von *E. hohenwartiana* ([Denis & Schiffermüller], 1775) getrennt und zu vollen Arten erhoben: *E. fulvana* (Stephens, 1834) sp. rev. und *E. parvulana* (Wilkinson, 1859) sp. rev. [= *scutana* (Constant, 1893) syn. n.]. Ihre Nahrungspflanzen werden angegeben und Lectotypen werden für *E. fulvana* und *E. parvulana* festgelegt.

Résumé. Ayant trouvé des différences constantes dans la structure de l'ovipositeur des femelles, les auteurs analyse le groupe d'espèces d'*Eucosma hohenwartiana* ([Denis & Schiffermüller], 1775). Deux taxons, dont le statut était douteux, sont de nouveau reconnus comme valides: *E. fulvana* (Stephens, 1834) sp. rev. et *E. parvulana* (Wilkinson, 1859) sp. rev. [= *scutana* (Constant, 1893) syn. n.]. On mentionne leurs plantes-hôtes respectives et on désigne lectotypes pour *E. fulvana* et *E. parvulana*.

Key words. Lepidoptera, Tortricidae, *Eucosma*, *hohenwartiana*, species group.

Introduction

The *Eucosma hohenwartiana* group of species comprises three taxa whose status has long been in question. The species described as *E. parvulana* (Wilkinson, 1859) has been treated in Britain as a form of *E. hohenwartiana* ([Denis & Schiffermüller], 1775) although in continental Europe it has retained specific status under the name *E. scutana* (Constant, 1893). *E. fulvana* (Stephens, 1834) has most often been treated as a form of *E. hohenwartiana* but not all authors have accepted this (e.g. Novák & Liška 1997). We will demonstrate that the three are distinct species. *E. hohenwartiana* itself is not in dispute, although in the past it was often confused with *E. cana* (Haworth, 1811). All are now accepted as belonging to the genus *Eucosma* Hübner, 1923, but in the past they have been assigned to various genera.

Wilkinson (1859) was first to recognise the three species of the group with which this paper is concerned: *E. scopoliana* (Haworth, 1811), *E. fulvana* (Stephens) and *E. parvulana* Wilkinson. His information on life history was not very precise. The name *E. scopoliana*, which he used for *E. hohenwartiana*, is not available since it is a junior homonym of *Tortrix scopoliana* [Denis & Schiffermüller], 1775.

Meyrick (1895) and Barrett (1907) placed *E. parvulana* as synonym of *E. scopoliana* for which species they gave *Centaurea nigra* as the host plant, although *E. parvulana*, treated by Barrett as a form, was said to swarm around *Serratula tinctoria*, whilst *Centaurea scabiosa* was given as the host plant of *E. fulvana* (treated as a species).

Meyrick (1928) introduced the generic name *Eucosma* but other information remained the same.

Spuler (1907: 281) described *E. scopoliana*, under which he refers to “Die englische v. *parvulana* Wlk.”, on *Cirsium*, *Carduus*, *Centaurea* and *Picris*. He recorded *E. fulvana* from *Centaurea iacea* and *C. lanceolatum*, and he also listed *E. scutana*.

Bradley (1959) introduced the name *E. hohenwartiana* in place of *E. scopoliana*, and under that name listed f. *scopoliana* and f. *parvulana*. Confusion in the past concerning the use of the name *E. hohenwartiana* was summarised by Barrett (1873) although this was chiefly confusion with *E. cana*.

Hannemann (1961) gave the same three species: *E. hohenwartiana* on *Centaurea*, *Carduus*, and *Cirsium*, *E. fulvana* on *Picris hieracioides* (but this was a misidentification of *E. balatonana* Osthelder), *Centaurea* and *Cirsium*, and *E. scutana* on *Serratula tinctoria*. He also illustrated the male genitalia.

Von Schantz (1962) regarded *E. fulvana* and *E. hohenwartiana* as separate species although stating that continental forms cannot always be distinguished from each other, whereas in England the two forms are quite distinct in colour and wing markings. He also gave differences in the genitalia, especially the females, which agree largely with our findings; however he illustrated the comparison only between *E. hohenwartiana* and *E. cana*. He did not mention *E. parvulana* nor its host plant *Serratula tinctoria*.

Opheim (1967) considered *E. fulvana* and *E. parvulana* to be merely British forms of *E. hohenwartiana*. He made many measurements of the valvae of the males showing a wide range of variation and based his opinion of the females largely upon the relative size of the two signa.

Bentinck & Diakonoff (1968) recognised *E. hohenwartian* and *E. fulvana*, illustrating the genitalia of both sexes and describing differences.

Bradley (in Kloet & Hincks 1972) indicated that the status of *E. fulvana* was doubtful. This was taken further by Bradley et al. (1979) when all three taxa were regarded as one species with *E. parvulana* and *E. fulvana* given as forms. They say of *E. fulvana*: “...which has usually been considered to be a separate species. However, as no tangible morphological difference can be found to separate *fulvana* from *hohenwartiana*, and superficially the two forms intergrade, they are treated here as one species.” *Centaurea nigra*, *C. scabiosa* and *Serratula tinctoria* were given together as host plants. Emmet (1979), although drawing largely on the manuscript of Bradley et al. (*loc. cit.*), was clearly unhappy about this and he gave *E. fulvana* as a distinct species feeding on *Centaurea scabiosa* with the comment “Possibly only a form of the preceding species (*hohenwartiana*)”. It is no surprise to find that Bradley & Fletcher (1979) and Bradley (1998, 2000) maintain the same position as Bradley et al. (1979), with *E. fulvana* listed as a form of *E. hohenwartiana*.

Kuznetsov (1989) listed the same species and host plants, illustrated the male genitalia, and provided a key to both external features and genitalia. Razowski (2001) briefly described just *E. hohenwartiana* and *E. scutana*, mentioning *E. fulvana* as an infrasubspecific form, citing Bradley as authority for that status. Recent checklists of countries in continental Europe vary in their treatment of the taxa *E. hohenwartiana*

and *E. fulvana*. Thus Karsholt & Razowski (1996), whilst listing the taxa separately, state that most authors regard *E. fulvana* as a form of *E. hohenwartiana*.

It was Razowski's (2001) illustration, together with the information about *E. scutana* feeding on *Serratula tinctoria*, that led us to ask whether this might be the same taxon as *E. parvulana*. Accordingly we set about obtaining more material and making genitalia preparations. Although not reared from larvae, our specimens were all taken on or near their respective host plants cited below.

Methods

Genitalia preparations were made of all three taxa from British specimens in our private collections, and a male and female of *E. scutana* from southern France in the collections of The Natural History Museum, London (BMNH), and of the lectotypes (designated below) of *E. fulvana* and *E. parvulana*. Further specimens and genitalia preparations on loan from Copenhagen (ZMUC) and Vienna (NMW) were examined, and a specimen of *E. scutana* from the Staudinger collection in Berlin, which he had received in exchange from Constant. The structures of the ovipositor of the females were measured using a scale in the microscope eyepiece and the specimens were identified, initially, only by the slide number. These measurements were arranged according to the length of the apophyses posteriores. In all we examined 23 females from Britain, and 28 from continental Europe. The lengths measured are shown in Fig. 1.

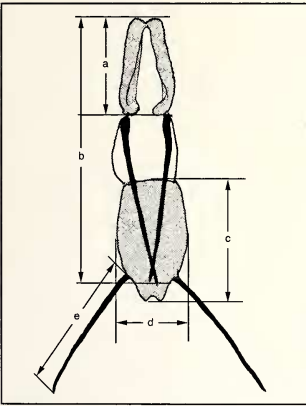


Fig. 1. Diagram showing ovipositor and measurements taken. **a.** The papillae anales (ovipositor pads). **b.** The posterior tip of the ovipositor to the anterior end of the apophyses posteriores. **c.** The length of the sclerotised plate of the 8th abdominal segment. **d.** The width of the 8th abdominal segment. **e.** The length of the apophyses anteriores.

Results

We found that the three taxa were clearly distinct. There appeared to be constant differences between the female genitalia of *E. parvulana* and *E. hohenwartiana*. The eighth segment of *E. hohenwartiana* was longer and narrower than the other two species and its ovipositor was also longer. Examination of specimens of *E. fulvana* showed that the female genitalia also differed from *E. hohenwartiana*, even though they were very similar to those of *E. parvulana*, except in size. Continental specimens showed similar differences to British specimens in the genitalia, but were not so easily separated on wing pattern and colour.

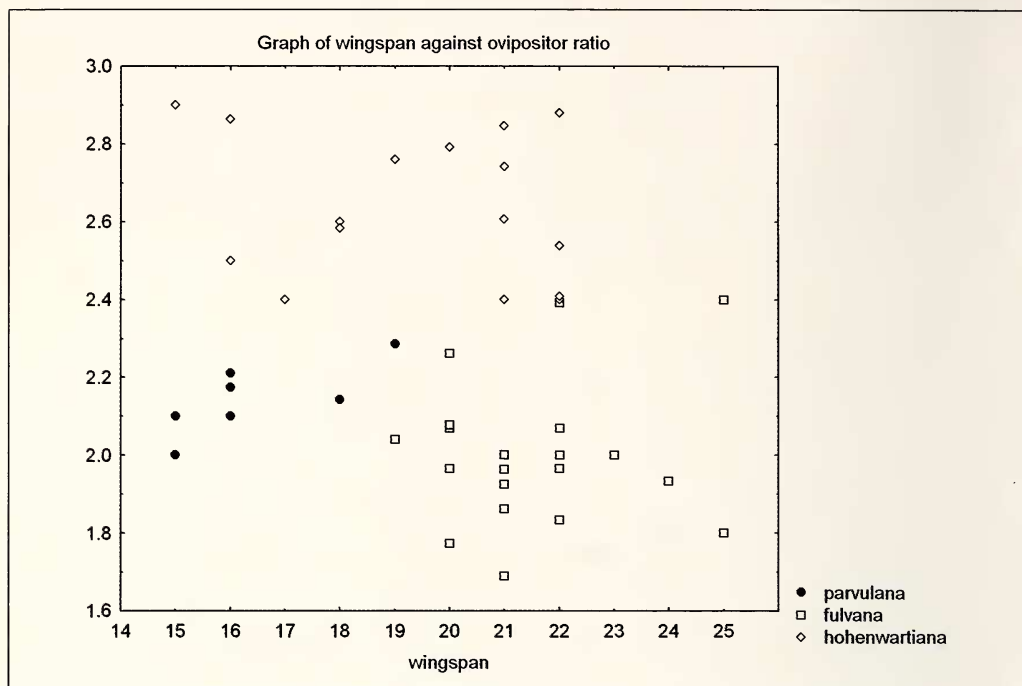


Fig. 2. Scatter diagram showing ratio of ovipositor to papillae (b/a) plotted against wingspan.

The results are shown in the scatter plot, Fig. 2, where the ratio of ovipositor length to papillae (b/a) is plotted against wingspan. All measurements are given in mm. It is therefore usually possible to separate the taxa as follows:

- 1 Ratio of ovipositor (including apophyses posteriores) to papillae anales (b/a) > 2.4 *E. hohenwartiana*
 Ratio of ovipositor (including apophyses posteriores) to papillae anales (b/a) < 2.4 2
- 2 Wingspan > 19.5mm, apophyses posteriores + ovipositor (b) > 1mm *E. fulvana*
 Wingspan < 19.5mm, apophyses posteriores + ovipositor (b) < 1mm *E. parvulana*

In cases where there is still doubt examination of the eighth segment should settle the determination. The differences in the size of the eighth abdominal segment are less easily measured, as each width (d) varies according to the arrangement of the preparation. However, the mean values of the length (c) of the sclerotised part of the segment in the specimens studied were *E. hohenwartiana* 0.57mm, *E. fulvana* 0.49mm and *E. parvulana* 0.39mm. There was slight overlap between the range of measurements of *E. hohenwartiana* and *E. fulvana*. Von Schantz (1962) stated that the projections at the anterior end of this segment (which he calls 'chitinplatte') are pointed inwards towards each other. We have not found this to be the case, although these projections are usually longer and more pointed in *E. hohenwartiana*.

Kuznetsov (1990), Hannemann (1961), von Schantz (1962), Bentinck & Diakonoff (1968) and Chambon (1999) illustrate and describe differences in the male genitalia, but Opheim (1967) points out that such a range of differences can occur within one species.

We have detected differences in the socii and uncus, as well as variation in the valvae, but no one character or combination of characters can be relied upon to separate the species. Since there are constant structural differences between the females of the three taxa, there are differences in size and wing-coloration and the host plants are distinct, we restore specific status to each of them. In his description of *E. scutana*, Constant (1893) gave the differences he saw between *E. scutana* and *E. parvulana*. We have considered these and although there are very slight differences in the wing pattern these do not, in our opinion, justify specific status. Therefore *E. parvulana* is raised from the synonymy of *E. hohenwartiana* and becomes the senior synonym for *E. scutana*. Barrett (1907) stated that small specimens of *E. hohenwartiana* are found everywhere with typical ones and he thought these the same as *E. parvulana*. We have included such specimens in our dataset and they are clearly nothing other than small specimens of *E. hohenwartiana*, having the comparatively long ovipositor which *E. parvulana* do not possess.

***Eucosma hohenwartiana* ([Denis & Schiffermüller], 1775)**

Figs. 3, 4, 5

Phalaena Tortrix hohenwartiana [Denis & Schiffermüller], 1775: 129, No. 15.

Tortrix scopoliana Haworth, 1811: 456 [homonym].

Tortrix pupillana Hübner, [1796]: pl.4, fig. 20 [homonym].

Catoptria hohenwarthiana Guenée, 1845: 189. *misspelling*.

? *Semasia jaceana* Herrich-Schäffer, 1851: 248.

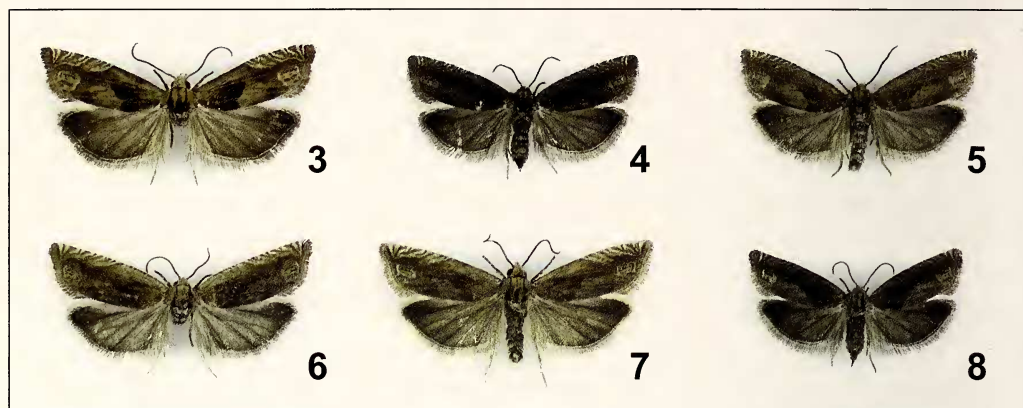
Description. Adult. Wingspan 15–22mm. This species is very variable in both size and wing pattern. The forewings are usually dark brown, often with contrasting markings, although paler more uniform specimens occur in continental Europe. In the female genitalia (Fig. 9) the ovipositor is long and slender. The apophyses posteriores are long and the eighth abdominal segment is also long.

Larva. Head pale to mid-brown, mouth parts and sutures dark brown. Prothoracic plate concolorous with head, mottled darker. Body pinkish ochreous to pink, minutely flecked whitish; anal plate concolorous, flecked pale brown; prolegs concolorous with body; thoracic legs translucent amber coloured. It feeds in flowers and developing seeds of *Centaurea nigra* in July and August; it then leaves the feeding place and hibernates fully fed in detritus on the ground. In continental Europe possibly on other *Centaurea* spp.

Remarks. *Eucosma jaceana* (Herrich-Schäffer) was treated by Hannemann (1961) as a distinct species, whilst Barrett (1873) and Kennel (1921) gave it as a synonym of *E. fulvana*. We have been unable to locate a type specimen but a specimen from the collection of O. Hofmann, who obtained many Microlepidoptera from the Herrich-Schäffer collection (Horn et al. 1990), was dissected and found to be identical to *E. hohenwartiana* even though the wing pattern was similar to *E. fulvana*.

Type material. The type specimens of *E. hohenwartiana* from Vienna have been destroyed (Horn & Kahle 1935). We would have liked to designate a neotype, but even with help from Austrian colleagues no specimen could be found which satisfied the conditions of paragraph 75.3.6 of the ICZN.

Distribution. Throughout Britain and Europe.



Figs. 3–8. Adults of the *Eucosma hohenwartiana* group of species (at constant scale). 3–5. *E. hohenwartiana*. 6–7. *E. fulvana*. 8. *E. parvulana*.

***Eucosma fulvana* (Stephens, 1834) sp. rev.**

Figs. 6, 7

Carpocapsa fulvana, Stephens, 1834: 123.

Description. Adult. Wingspan 19–25mm. In Britain distinguished by its large size and fulvous coloration, paler than *hohenwartiana*. In the female genitalia (Fig. 11) the apophyses posteriores are short but the eighth segment is of moderate length.

Larva. Head pale brown, mouthparts and sutures dark brown. Prothoracic plate very pale honey coloured, translucent. Body creamy whitish to pink; anal plate concolorous with prothoracic plate, sparsely flecked dark brown; prolegs and thoracic legs concolorous with body. Feeds on *Centaurea scabiosa* in the same manner as the preceding species.

Type material. The species is described from the neighbourhood of London. A female specimen in the Stephens collection in the Natural History Museum, London bearing a type label is hereby designated as the lectotype. It is identified by a purple lectotype label, a label inscribed “Stephens Coll. | *Carpocapsa fulvana* Steph | Named by Steph.” a label bearing the slide No. 30755 and a label “lectotype | *Carpocapsa fulvana* Stephens | det. D. Agassiz & J. Langmaid, 2003.” This designation is made since the original publication did not specify the number of specimens.

Distribution. Widespread in Britain and Europe, but the exact distribution is unclear because of former confusion with *E. hohenwartiana*.

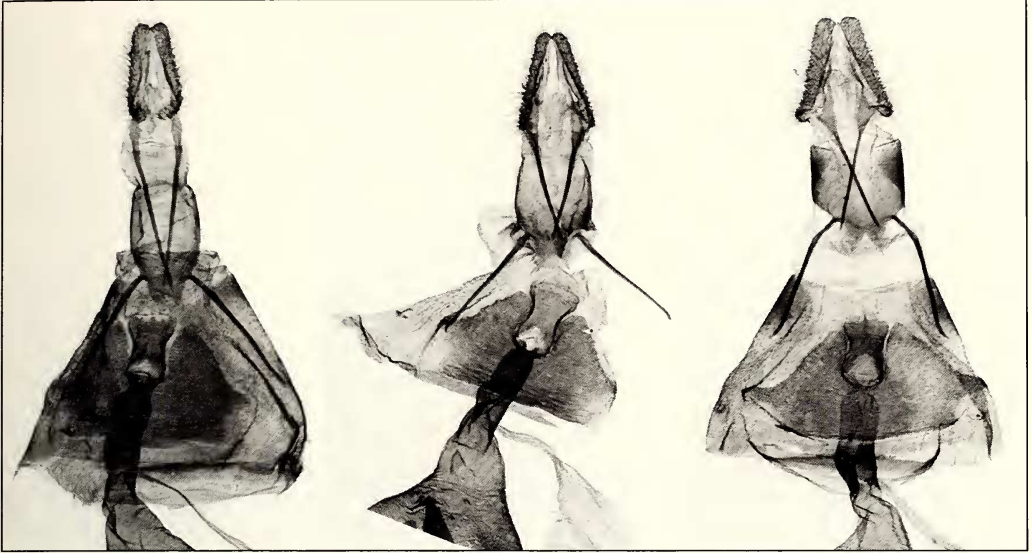
***Eucosma parvulana* (Wilkinson, 1859) sp. rev.**

Fig. 8

Catoptria parvulana Wilkinson, 1859: 91, pl. 1 fig. 6.

Grapholitha scutana Constant, 1893: 391, pl. 11 fig. 3, syn. n.

Description. Adult. Wingspan 14–19 mm. Distinguished by its small size, although small specimens of *E. hohenwartiana* also occur. The forewings are more uniformly coloured and strongly contrasted specimens, as often found amongst *E. hohenwartiana*, are not known. In the female genitalia (Fig. 10) the apophyses posteriores



Figs. 9–11. Ovipositors of the *Eucosma hohenwartiana* group of species (not to the same scale). 9. *E. hohenwartiana*. 10. *E. parvulana*. 11. *E. fulvana*.

of *E. parvulana* are short, as is also the eighth abdominal segment. The ovipositors of the specimens from France named *E. scutana* which were examined fell entirely within the range of variation of *E. parvulana*.

Larva. Head amber coloured, mouthparts dark brown. Prothoracic plate colourless, translucent. Body pale pinkish ochreous; anal plate, prolegs and thoracic legs all concolorous with body. It feeds on *Serratula tinctoria* in the same manner as the preceding two species.

Type material. The species is described from the Isle of Wight. In the Hunterian Museum, Glasgow, there are two specimens, ♂ and ♀, from the Wilkinson collection. The ♀ No. 118973 is hereby designated the lectotype so that the taxon is clearly distinguishable by its type material, the specimen has a purple lectotype label, a label reading “*Catoptria parvulana* Wilkinson, 1859 | ex Wilkinson Colln | ?possible syntypes”, and a label “LECTOTYPE | *Catoptria parvulana* Wilkinson | det. D. Agassiz & J. Langmaid 2003.

Distribution. In Britain recorded from South Hampshire and the Isle of Wight, in continental Europe from southern France and Germany eastwards through Italy and the Balkan states to Romania. Two specimens from Høvblege, Denmark, ♂ and ♀, were identified by Niels Wolff as *E. parvulana* and the female agrees with this species both in appearance and genitalia even though *Serratula tinctoria* is very rare. The species may be more widespread but recorded as *E. hohenwartiana*.

In continental Europe there are more *Centaurea* spp. than in Britain and the host range of some of these species may be wider. It is also unclear whether all the host plants listed in continental literature can be verified and further study to confirm the associations would be of interest.

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References

- Barrett, C. G. 1873. Notes on some Tortrices. – *Entomologist's Monthly Magazine* **10**: 4–6.
- Barrett, C. G. 1907. The Lepidoptera of the British Islands, **11** Heterocera: Tortricina. – L. Reeve & Co., London. 293 pp. pls. 470–504.
- Bentink, G. A. & A. Diakonoff 1968. De Nederlandse Bladrollers (Tortricidae). – *Monografieën van de Nederlandsche Entomologisch Vereeniging* **3**. 1–200, 99 pls.
- Bradley, J. D. 1959. An illustrated list of the British Tortricidae Part II: Olethreutinae. – *Entomologist's Gazette* **10**: 60–80, pls. 1–19.
- Bradley, J. D. 1998. Checklist of Lepidoptera recorded from the British Isles. – Privately published, Fordingbridge, vi + 106 pp.
- Bradley, J. D. 2000. Checklist of Lepidoptera recorded from the British Isles. Second Edition (Revised). – Privately published, Fordingbridge, vi + 116 pp.
- Bradley, J. D. & D. S. Fletcher 1979. A recorder's log book or label list of British Butterflies and Moths. – London. 136 pp.
- Bradley, J. D., W. G. Tremewan & A. Smith 1979. British Tortricoid Moths. Tortricidae: Olethreutinae. – Ray Society, London. viii + 336 pp, 43 pls.
- Chambon, J. P. 1999. Atlas des genitalia mâles des Lépidoptères Tortricide de France et Belgique. – INRA, Paris, 400 pp., 180 pls.
- Constant, M. A. 1893. Descriptions d'espèces nouvelles de Microlépidoptères. – *Annales de la Société Entomologique de France* **62**: 391.
- [Denis, M. & I. Schiffermüller] 1775. Ankündigung eines systematischen Werkes von den Schmetterlingen der Wienergegend. – Wien. 323 pp. 3 pls.
- Emmet, A. M. (ed). 1979. A Field Guide to the smaller British Lepidoptera. – The British Entomological and Natural History Society, London. 271 pp.
- Guenée, A. 1845. Essai sur une nouvelle classification des Microlépidoptères et catalogue des espèces Européennes connues jusqu'à ce jour. – *Annales de la Société Entomologique de France* (ser. 2) **3**: 105–192.
- Hannemann, H. J. 1961. Kleinschmetterlinge oder Microlepidoptera I. Die Wickler (s.str.) (Tortricidae). – *In*: F. Dahl, *Die Tierwelt Deutschlands* **48**. – Gustav Fischer, Jena. xi + 233 pp., 22 pls.
- Haworth, A. H. [1811]. *Lepidoptera Britannica*. – London. xxxvi + 609 pp.
- Herrich-Schäffer, G. A. W. 1851. Systematische Bearbeitung der Schmetterlinge von Europe, IV Tortricidae. – Regensburg. 288pp.
- Horn, W. & I. Kahle 1935. Über entomologische Sammlungen, Entomologen & Entomo-Museologie. Ein Beitrag zur Geschichte der Entomologie. – *Entomologische Beihefte, Berlin* **2** (1935): 1–160, pls. 1–16; *ibidem* **3** (1936): 161–296, pls. 17–26; *ibidem* **4** (1937): 297–388, pls. 27–38, pp. 511–533, i–iv.
- Horn, W., I. Kahle, G. Friese & R. Gaedike 1990. *Collectiones entomologicae*, part 1 + 2. – Akademie der Landwirtschaftswissenschaften, Berlin. 573 pp.
- Hübner, J. [1796]. *Der Sammlung europäischer Schmetterlinge siebente Horde. Tortrices-Wickler*. – Augsburg. 340 pls.
- Karsholt, O. & J. Razowski 1996. A distributional checklist of European Lepidoptera. – Apollo Books, Stenstrup. 380 pp.
- Kennel, J. 1908–21. Die Palaearktischen Tortriciden. – *Zoologica* **21** (54): 1–742, text figs. 1–40, pls. 1–24.
- Kloet, G. S. & W. D. Hincks 1972. A check list of British Insects. 2nd ed., part 2. – Royal Entomological Society, London. viii + 153 pp.
- Kuznetsov, V. I. 1989. 21. Family Tortricidae (Olethreutinae, Cochyliidae) – Tortricid Moths. Pp. 277–956. – *In*: M. I. Falkovich & G. S. Medvedev (ed.), *Keys to the Insects of the European Part of the USSR*, **4**: Lepidoptera 1. – E. J. Brill, Leiden, New York, København, Köln. xvi + 991 pp.

- Meyrick, E. 1895. A Handbook of British Lepidoptera. – London. vi + 843 pp.
- Meyrick, E. 1928. A revised Handbook of British Lepidoptera. – London. vi + 914 pp.
- Novák, I. & J. Liška 1997. Catalogue of the Bohemian Lepidoptera. – Klapalekiana 33, Suppl.: 159 pp.
- Opheim, M. 1967. The Norwegian species of *Bactra* Steph. and *Eucosma* Hb. (Lep. Tortricidae). – Opuscula Entomologica 32: 79–92.
- Razowski, J. 2001. Die Tortriciden (Lepidoptera, Tortricidae) Mitteleuropas. – Slamka, Bratislava. 319 pp.
- Schantz, M. v. 1962. *Eucosma danicana* n. sp. und einige dieser nahestehende *Eucosma* Arten. – Notulae Entomologica 42: 1–8.
- Spuler, A. 1903–1910. Die Schmetterlinge Europas. II. Band. – Stuttgart. 523 pp.
- Stephens, J. F. 1834. Illustrations of British Entomology. – Haustellata 4: 436 pp.
- Wilkinson, S. J. 1859. The British Tortrices. – London. viii + 328 pp, 4 pls.